

FAST® Service Manual

FOR USE WITH

(NSF Std 40 & 245) MicroFAST® 0.5, 0.625, 0.75, 0.9, 1.5 (non-NSF certified) MicroFAST® 3.0, 4.5, 9.0 (ETV/EPA tested) RetroFAST® 0.150, 0.250, 0.375 NitriFAST® 0.5, 0.625, 0.75, 0.9, 1.5, 3.0, 4.5, 9.0 HighStrengthFAST® 1.0, 1.5, 3.0, 4.5, 9.0



SERVICE MANUAL

FOR USE WITH FAST® SYSTEMS:

(NSF® Std 40/245 cert.) MicroFAST® 0.5, 0.625, 0.75, 0.9, 1.5 (Non-NSF cert.) MicroFAST® 3.0, 4.5, 9.0 (ETV/EPA tested) RetroFAST® 0.150, 0.250, 0.375

NitriFAST® 0.5, 0.625, 0.75, 0.9, 1.5, 3.0, 4.5, 9.0 HighStrengthFAST® 1.0, 1.5, 3.0, 4.5, 9.0

GENERAL INFORMATION

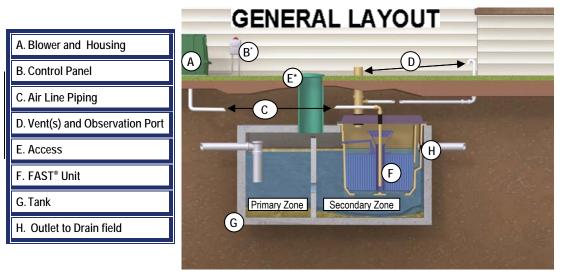
All FAST® products are ETL certified for safety (electrical, environmental, etc.). One or more of the following patents protects this process: 3,966,599; 3,966,608; 3,972,965; 5,156,742. Certified by NSF International, the MicroFAST® 0.5, 0.625, 0.75, 0.9 and 1.5 systems meets NSF Standard 40, Class 1 and Standard 245 certifications for wastewater treatment devices. If you have questions regarding any Bio-Microbics products, please contact us:

800-753-FAST (3278) or (913) 422-0707

e-mail: onsite@biomicrobics.com

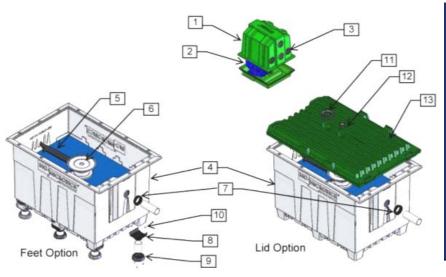
About FAST®: The FAST® (Fixed Activated Sludge Treatment) system uses naturally occurring bacteria (biomass) to treat sewage for dispersal into the environment. This continuous process provides the biomass with waste (food) and air in a suitable environment. Dead bacteria and non-biodegradable waste settle and accumulate in the bottom of the tank for periodic removal.

The FAST® process consists of the treatment module and blower. The blower provides air to the system via the air supply pipe. The air supply pipe and draft tube create an air lift. The air lift mixes oxygen and waste throughout the media inside the tank. Bacteria grows on the media and digests the waste. A vent pipe expels harmless vapors created by the process.



*PLEASE NOTE: Adequate pump out must be provided for primary and secondary zones. There may be ancillary equipment associated with your system: pump(s) (before and/or after the FAST® unit), a distribution box, a disinfection system, an irrigation system, a remote alarm, or auto dialer, etc.

SYSTEM COMPONENTS



SUPPLIED EQUIPMENT

Please refer to the Installation Manual for a list of your system's original supplied parts.
Picture shown is the MicroFAST® standard parts diagram.

If replacement parts are needed please have the serial number ready and call the local distributor listed on the control panel or Bio-Microbics.

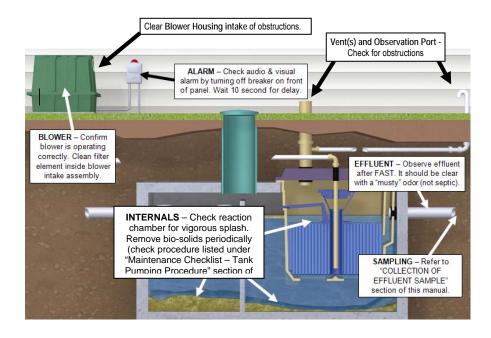
COMMON NAME

- 1. Blower Housing
- 2. Blower (with blower I/O piping, Inlet Filter Assembly, blower and housing screws not shown)
- 3. Louver
- 4. Liner
- 5. Recirculation Trough
- 6. Air Lift

- 7. 4" Outlet Gasket
- 8. Foot Top (foot option)
- 9. Foot Bottom (foot option)
- 10. Foot Screws (foot option)
- 11. 6" Observation Port Gasket (lid option)
- 12. 2" Air Line Gasket (lid option)
- 13. Lid (Optional) (Not with MCF 4.5 or 9.0)

REGULAR SERVICE MAINTENANCE

Always secure all access covers to prevent unauthorized people from entering the tank. Only qualified service personnel should open access ports and/or covers. Infectious organisms exist in a septic tank. If any contact with wastewater occurs, immediately wash and disinfect all exposed areas and contact personal physician. Failure to do so could result in severe sickness or death. DO NOT use an open flame or cause a spark near a septic tank's access points. Gases emanating from septic tanks can explode if ignited or deadly if inhaled.



NORMAL OPERATING CONDITIONS The FAST® system's blower makes a constant humming noise, much like a household refrigerator. Under normal SOUND conditions, the blower should last 5+ years without need for replacement. If an unusual noise is heard, refer to the Trouble-Shooting Guide. A musty, earthy-type of odor is normal. However, if a sewage ODOR odor (rotten egg smell) is detected, refer to the Trouble-Shooting Guide. A properly loaded and operated FAST® system will produce effluent that looks like tap water. If SIGHT the effluent is turbid, opaque, or suddenly changes, refer to the Trouble-Shooting Guide.

DO'S & DON'TS......What can I put down the drain?

Please refer to the list below for important information on how to help keep your treatment system performing as it should.

A CAUTION Introducing harmful or damaging substances into the FAST system may void the warranty.

Do not put these items down the drain:

FOOD WASTES	ANIMAL BONES / COFFEE GROUNDS / CORN COBS / EGG SHELLS / SKIN / FRUIT PEELS / MELON RINDS / HOME BREWERY WASTE
PERSONAL PRODUCTS	BANDAGES / CONDOMS / SANITARY NAPKINS / WET WIPES / DISPOSABLE DIAPERS
CHEMICALS/TOXINS	AUTOMOTIVE FLUIDS / CAUSTIC CLEANERS / DRUGS / FLOOR STRIPPER / HARSH DETERGENTS / HERBICIDES / MEDICATIONS / PAINTS (OIL-BASED) / PESTICIDES / AMMONIUM CHLORIDE CLEANERS / SOLVENTS / THINNERS
OTHER PRODUCTS	CAT LITTER / CIGARETTE BUTTS / CLOTH TOWELS / FILM DEVELOPING WASTE / METAL OBJECTS / MODELING CLAY / PAPER TOWELS / SCRAPS / PLASTIC BAGS / PLASTIC OBJECTS / RAGS / RV WASTE

RECORD KEEPING

Keep copies of all system drawings/plans of the site/installed equipment/service records with all other home appliance documents. Record all applicable information.

LAUNDRY

Spread wash loads throughout the week. Instead of liquid fabric softener, dryer sheets should be used. Use lowsuds, biodegradable and low phosphate detergents, like Mighty Mike® from Scienco/FAST (www.sciencofast.com).

LEAKY FIXTURES

Large quantities of water are added to your wastewater system when you have leaking fixtures. Timely detection and repair can help to maximize the life of your system, especially the drain field.

WATER SOFTENERS

The FAST® process may tolerate discharge from properly operating softeners that backwash as needed based on water usage (DIR) vs. timer operated systems, if allowed by your local regulatory authority. However, these discharges can possibly damage other parts of the septic system.

FOOD WASTES

Garbage disposal waste is acceptable - if allowed by your local regulatory authority. However, it may lead to more frequent removal of solids from your septic tank. Please dispose of large quantities of food in the garbage.

FATS, OILS & GREASE

Too much grease (i.e. animal fats, vegetable oils, lard, etc) put down the drain may overload the system and prevent the bacteria from fully breaking down the waste.

DISINFECTANTS / CLEANERS

Use citric acid, chlorine, or biodegradable cleaners according to the manufacturer's recommendations. Products containing ammonium chloride compounds or pine oil-based cleaners should not be used. Use drain cleaners as a last resort to unclog pipes.

GARAGE AND WORKROOM

Drains from these areas should be diverted away from your septic system. Petroleum-based products and saw dust should not enter the system.

MEDICATIONS

DO NOT FLUSH UNUSED MEDICATIONS DOWN THE DRAIN. Unused medications should be returned to the pharmacy, doctor, or thrown away in the trash. NOTE: As the human body absorbs ≤20% of these medications, please notify your service provider of medications taken frequently or used intermittently in the house. This could reduce troubleshooting efforts and possibly your maintenance bill.

SEPTIC TANK ADDITIVES / ENZYMES

The wastewater in the system typically contains all the required bacteria for proper operation. Commercial additives are most often unnecessary; and may do more harm than good.

PAPER PRODUCTS

Use single- or double-ply, non-quilted, white toilet paper products. Some color dyes in the paper cannot be eaten by natural bacteria. Non-bleached paper (brown in color) takes longer to break down and can therefore increase the pump out frequency of your tank. Avoid flushing paper towels, napkins, wipes, or other thicker paper material.



Always secure all access covers to prevent unauthorized people from entering the tank. Only qualified service personnel should open access ports and/or covers. Infectious organisms exist in a septic tank. If any contact with wastewater occurs, immediately wash and disinfect all exposed areas and contact personal physician. Failure to do so could result in severe sickness or death. DO NOT use an open flame or cause a spark near a septic tank access points. Gases emanating from septic tanks can explode if ignited or deadly if inhaled.

MAINTENANCE CHECKLIST

BLOWER OPERATION DO NOT turn off the blower (unless testing alarm). Treatment quality and drain field life could be reduced. Check the blower for proper function. Clean the blower's inlet air filter element. The blower can be operated by a timer in certain situations. Contact your local Bio-Microbics distributor for more information. If the blower is malfunctioning please refer to the "Troubleshooting Guide" or Blower Replacement Section located in this manual.
<u>ALARM PANEL AND ALARM SOUNDS</u> The alarm has a ~10 second built-in delay. Test the audible alarm by turning the blower OFF. To silence the alarm, use the "RESET" button on the panel's front. If the alarm is activated for an unknown reason, please refer to the "Troubleshooting Guide" located in this manual.
<u>VENTS, ODORS, AND INTAKES</u> Clear the vent(s) and blower housing intakes of any obstructions. Please refer to the "Troubleshooting Guide" located in this manual if you detect septic odors coming from the FAST® vent as this may indicate a problem with the system.
WATER QUALITY effluent should be clear and odorless. All FAST® systems are capable of exceeding the USEPA standard for secondary wastewater treatment (40CFR, part 133.102) depending on how they are applied, sized, installed and operated. If samples are required please refer to the "Collection of Effluent Sample" section below.
BIO-SOLIDS (SLUDGE) LEVELS Scheduling sludge removal depends on the size and design of the septic tank. Check the sludge levels in both

- 1. 18" deep in the primary settling tank or is within 6" of the connection point between the settling tank and the secondary/treatment zone; and/or
- 2. Within 3"-4" of the bottom of the FAST® unit in the treatment tank.

To determine the proper measurement for #2 above, measure the total liquid depth of the treatment tank (containing the FAST® unit) using a sludgemeasuring instrument. Take that value and subtract the height of the FAST® product (in the table below). The result is the total sludge storage height available in the tank.

tanks/compartments by inserting a sludge-measuring instrument and taking measurements in multiple locations in each compartment of the tank(s).

FAST [®] Models	Module Height
ALL RetroFAST®	27" [68.5 cm]
FAST® Models 0.5, 0.625, 0.75, 0.9, 1.5, & 4.5	31" [79 cm]
FAST® models 3.0 & 9.0	55" [140cm]

All stricter, applicable regulations supersede these operational directions. Always pump out both zones, even if only one zone may require it.

TANK PUMPING PROCEDURE:

Pump both compartments/tanks if the sludge is:



Only qualified service personnel should open access ports/covers. If any contact is made with wastewater, immediately wash and disinfect all exposed areas and contact personal WARNING physician. Failure to do so could result in severe sickness or death.

Avoid pumping down after periods of heavy rain or when the ground water is likely to be above the bottom of the concrete tank. Emptying the tank under these conditions could cause CAUTION the tank to float up and become dislodged.

- 1. Open the access ports/cover(s) and insert the hose. Always pump out both settling and treatment chambers of the system, even if only one side requires it.
- Once the unit has been pumped out, immediately refill the tank with clean water to reduce the risk of the tank floating and to minimize the impact on treatment. Close the access ports/cover(s) making sure it is watertight.
- 3. Properly dispose of the solids removed in compliance with local and state regulations.

COLLECTION OF EFFLUENT SAMPLE

Please contact your local distributor or Bio-Microbics for a copy of the "Testing Protocol" document. Important: All samples must be collected, stored, transported and tested according to the "Testing Protocol" document by Bio-Microbics and the most current version of Standard Methods.

OTHER SYSTEM COMPONENTS (if applicable)

Check <u>LIXOR® PRE-AERATION DEVICE</u> blower, inlet filter, blower housing, and air delivery system for proper function.
Check INFLUENT BIOSTEP® PUMP(S) for proper function. Clean the screening device by using built in swab or other method.
Check SANITEE® EFFLUENT SCREEN (FILTER) or other screening device. Clean by using the built in swab or other method.
<u>DISPERSAL SYSTEM</u> (not by Bio-Microbics) Follow manufacturer's recommendation.

TROUBLESHOOTING GUIDE Contact factory or local distributor for all other issues: (913) 422-0707

PROBLEM	SITUATION	POSSIBLE CAUSE / SOLUTION
(f	ning problem ider	> Breaker has tripped – turn blower switch ON. If the switch will not stay ON, see next steps
dinç	OI runr Iowing. If rivice prov	> Breaker trips after 2-3 seconds – blower is over amping – electrician needs to check blower wiring.
oun	Blower is NOT running Please check the following, If problem persists, call service provider	> Breaker trips immediately – electrical system has a short – electrician must investigate
s) pə	Blow Please ch persi	> Blower is seized – cooling fan will not spin freely with power OFF – replace blower – call service provider
tivat	oblem r	➤ Water Level is high – check the water level in the unit. Water level should be 2-3 inches above the media. Water level high? YES: consult distributor. NO: Go to next step.
Alarm is activated (sounding)	<u>is</u> running following. If pr service provide	➤ Liquid Level Switch Present – NO: Go to next step. YES: Check if wired in the same conduit as 90 VAC or higher wires (a violation of electric code NEC/IEC). If YES: Wires will need to be separated.) – If NO: Switch may need adjusting. Turn switch's Allen screw clockwise, wait ~10 seconds for alarm to "catch up".
larn	Blower is running Please check the following. If problem persists, call service provider	Current Sensor Present – YES: Open panel and find "Diagnostic LED's" in the upper right hand corner. Note which light is lit and consult the distributor. NO: Consult distributor
A		> Vent is undersized or Vent(s) or airline is blocked or broken – Check specifications for vent sizing requirements. Remove blockage or repair vent(s) or airline.
is up nk	Blockage in pipe network.	> Check all piping for blockage, including all interior tank piping and effluent piping.
Waste is packing up from tank	Mechanical failure of	> Pump is not running – have qualified person check pumping system for mechanical and/or electrical failures.
Waste is backing up from tank	ancillary equipment	> Pump's Level Controls are improperly set, have failed, or pump too much volume per dose. Have service provider check/adjust pumping system.
<u> </u>	Mechanical failure/ Air line break	➤ Blower operating – NO, check "blower is not running" above, YES see next step
odo		➤ Proper splash in reaction chamber – NO – air line is broken, YES see next steps
nits Ig sr	e is e is ized ole	> Decrease settling tank volume – easiest done with a pumping system which can then pump the tank
System emits odor (rotten egg smell)	sues ca ne caus o overs x. Multip	> Move vent – re-locate the vent to a location where the prevailing winds will catch odor.
ster otte	Multiple issues can contribute; the cause is usually due to oversized settling tank. Multiple solutions possible.	> Place a carbon filter on the end of the vent pipe – only use a filter that will create less than 0.1 psi of back pressure.
Sy (r		> Create bio-filter vent - create a remote vent by placing a well perforated vent line in a trench with shredded bark mulch - contact local installer
runs ards	3-Phase installed incorrectly power out of phase or	> Switch any two "hot legs" at the panel or blower AFTER turning OFF the power. Only a QUALIFIED electrician can do this work. After rewiring, it may be necessary to dry the blower's internal parts.
Blower runs backwards	Single-Phase (which can run counter-clockwise) installed incorrectly	> Some blowers have wires numbered "5" and "8". After turning OFF the power, switch these two wires. Only a QUALIFIED electrician can do this work. After re-wiring, it may be necessary to dry the blower's internal parts.
	Blower noise is an	> Blower housing can be supplemented with additional sound reducing measures, contact your service provider.
er is Sy	annoyance at site	> Blower may be re-located from its current location and can be placed up to 100 ft away from unit.
Blower is noisy	Blower is shaking or makes a loud, whiny noise	> Vibration between the blower and housing – tighten or place rubber washers in mounting screws between blower and housing
ш		➤ Blower bearings are going bad - replace blower now or wait for it to seize up
nt y	Many solids detected in effluent	> Toxic substance in system, check for even growth in reaction chamber
Effluent is dirty		> Pump out required – refer to "Bio-Solids Levels" under "Maintenance Checklist" section
Ef		> Other – call service provider
in ir/	Water entry from outside	➤ Move blower above flood level
Water in blower/ housing	Blower is siphoning	➤ Check blower rotation – see "Blower runs backwards" section above
W ld		➤ Move blower to location higher than the FAST® system

SEASONAL / INTERMITTENT USE PROPERTIES

The FAST® System will function normally even if there is no wastewater flowing during short periods of vacancy. Examples of seasonal/intermittent use and suggested operational procedures:

- Summer use property (shut down all winter) blower should be turned off at end of summer and restarted at least a week before returning. Please contact your local service provider to restart the system and check with local regulations.
- Weekend property (used at least once every three weekends) maintain normal operation or utilize FAST's SFR® blower timer feature on control panel.

Important: Consult your service provider and local regulations prior to any system changes.

BLOWER REPLACEMENT

WARNING

All electrical work shall be properly performed by a qualified electrician per all applicable codes. Failure to do so may result in severe bodily injury or death.

Hazards exist in confined spaces such as a septic tank. All confined space precautions must be followed if entering a tank. Always keep tank openings covered NARNING during storage and installation

When replacing a blower follow the steps below. If relocating the blower run the electrical supply conduit from the control panel to the desired blower location. Air line piping from the blower to the FAST® unit may NOT exceed 100 ft [30.5m] in total length and must have ≤ 4 elbows. The total electrical supply should NOT exceed 150 ft [45 m]. The blower and blower housing must be mounted on a solid base such as concrete to avoid settling.



CONNECT SUPPLIED PIECES (refer to picture)

- Longest steel pipe
- Steel elbow
- Air filter assembly
- Shortest steel pipe
- PVC reducer bushing

SECURE BLOWER ASSEMBLY to housing base using four supplied #14 x 1½" self-tapping screws. Drill screws directly into blower base.

RECONNECT AIR LINE from FAST® unit to blower outlet using required piping. A "quick disconnect" is highly recommended to be installed in this location if it is not currently in place.

NOTE: ALL CONNECTIONS MUST BE AIR AND WATER TIGHT

CONNECT INCOMING POWER to the blower at junction box. Follow the FAST® Installation Manual for further instruction. Common wiring diagrams are located at the end of this manual.

LIQUID LEVEL SWITCH - NOT required for most new systems. AMI control panel with current sensor replaces this switch. To replace this switch:

- Drill a ³/₈" hole in the blower outlet pipe. a)
- b) **IMPORTANT**: Connect low voltage wires to switch before mounting in pipe.
- Insert the switch into the ³/₈" hole (nipple first), then glue into place with PVC glue. c)
- Install low voltage pressure switch wiring back to the control panel according to applicable codes (must not be inside high voltage blower wiring).

CONTROL PANEL REPLACEMENT



Always have all utility lines and equipment marked by a locating service prior to performing any work.

WARNING All electrical work shall be properly performed by a qualified electrician per all applicable codes. Failure to do so may result in severe bodily injury or death.

The FAST® systems, including all electrical parts, are ETL (UL equivalent) certified for electrical safety. The control panel meets NEMA4X standards for all weather use (not explosive or submerged environments). The total electrical supply should NOT exceed 150 ft [45m].

Bio-Microbics also manufactures control panels that can control other systems, such as UV and sewage pumps. Call your distributor or Bio-Microbics for more information.

When replacing a panel follow the steps below. If relocating the panel run the electrical supply conduit from the control panel to the blower location. Keep in mind the electrical supply line should NOT exceed 150 ft [45 m] total.

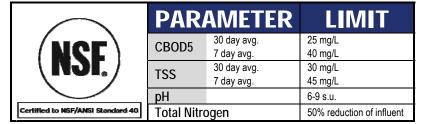
- 1. Examine wiring directions inside the supplied FAST® control panel (also found at the end of this Manual).
- 2. A dedicated breaker is required in the building's master electrical panel. Make connections between the master panel and FAST® control panel.
- 3. Make connections between the blower and FAST® control panel per the electrical diagram.
- 4. For systems requiring the Liquid Level Switch- connect the switch to the control panel terminals labeled "FLOAT" or "HI Press Input". The newest AMI control panel with current sensor can be used to replace this switch.

CERTIFICATIONS

M WARNING

Only authorized service personnel should service a septic system and its components. Deadly hazards such as lethal gases and high voltage electricity are associated with the system.

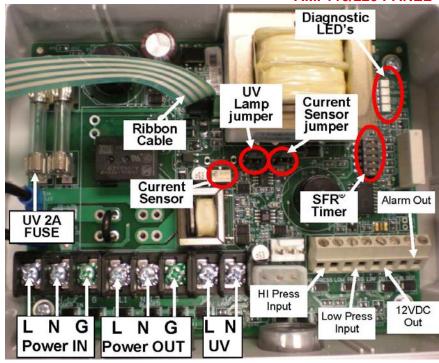
MicroFAST® 0.5, 0.625, 0.75, 0.9, and 1.5 systems are tested and certified to NSF®/ANSI® Standards 40 (Class I) and 245



ELECTRICAL WIRING DIAGRAMS

Only the MicroFAST® 0.5, 0.625, 0.75, and 0.9 system diagrams are displayed here. Information for larger FAST® systems ships with those units or can be obtained from Bio-Microbics.

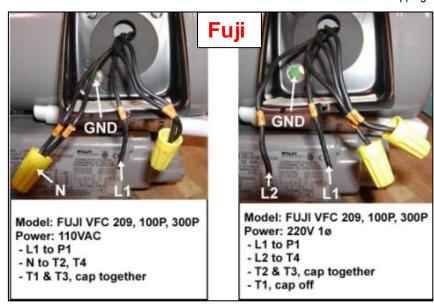
AMI 110/220 PANEL

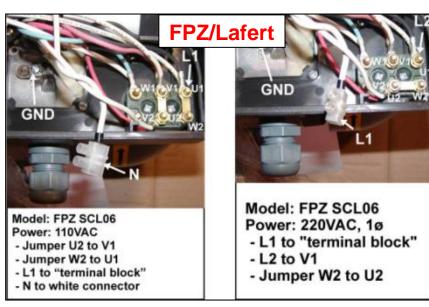


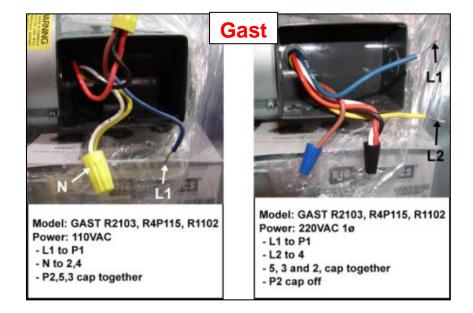
	TIMING MODES BLOWER			WER		
DIP SWPOS. (S1)				MINUTES		
.5	4	3	2	1	ON	OFF
Off	Off	Off	Off	Off	30	15
Off	Off	Off	Off	On	15	15
Off	Off	Off	On	On	30	30
Off	Off	On	Off	Off	60	15
Off	Off	On	Off	On	60	30
Off	Off	On	On	Off	120	30
On	On	On	On	Off	TEST	
On	On	On	On	On	∞	
TEST = 15 SEC ON, 20 SEC OFF						
$\infty = ALWAYSON$						

BLOWER DIAGRAMS

ATTENTION: Please refer to side of shipping box for correct Blower.







LIMITED WARRANTY

Bio-Microbics, Inc. warrants every new residential FAST® system against defects in materials and workmanship for a period of two years after installation or three years from date of shipment, subject to the following terms and conditions, (Commercial FAST system for a period of one year after installation or eighteen months from date of shipment, whichever occurs first, subject to the following terms and conditions):

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

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Contact your local distributor for parts and service.

Keep for Your Records



Module System Serial Number:
System Designer Name:
Designer Phone:
Health Official Name:
Health Official Phone:
Manufacturer Name: Bio-Microbics, Inc.
Manufacturer Phone: <u>1-800-753-FAST (3278)</u>
Installed By:
Installer Phone:
Maintenance Provider Name:
Maintenance Provider Phone:



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